



## Development of norms for selected physical fitness parameters of male football goalkeepers

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### Abstract

Availability of norms for different selection parameters in sports with the view to maintain objectivity is very essential. In the Football context, much research have not been done in this regard. Hence, this study was aimed to develop norms for selected physical fitness parameters of Football goalkeepers. A sample of 40 Football goalkeepers was recruited purposively from the Guru Nanak Dev University, Amritsar. Subjects were tested for selected physical fitness parameters viz. Muscular strength, Muscular power, Muscular endurance, Running agility, Running speed, Jumping ability, Throwing ability, Flexibility and Balance. Percentile scale was used in order to develop the norms. The scores were ordered in to five grades viz. very poor, poor, average, good and very good.

**Keywords:** norms, physical fitness, football, goalkeepers

### 1. Introduction

In the discipline of physical education and sports, evaluation plays a dynamic part since the beginning. The levels of the physical education and sports process are articulated with the tests, measurements and evaluations. These comprise methods to quantify the student's progress and status of growth, their improvement and the accomplishments (Singh and Singh, 2013) <sup>[1]</sup>. Measurement and Evaluation are essential for the purpose of identifying talent in the sports. The practice of evaluation in general education and Physical education is a continuous process. Measurement and evaluation of performance are crucial to decide to which extent the framed purposes have been achieved, how effectual the progression has been, and how much significant the outcome is (Singh and Singh, 2013) <sup>[1]</sup>. The outcomes specify the direction and the degree of progress in performance. In athletics and physical education, as in education and in life, student's performance is constantly measured and evaluated by the teacher and coach (Sarkar, 2010) <sup>[2]</sup>.

Football, initially a sport served the purpose of recreation, gradually, evolved into competitive sport that demand a higher level of physical fitness and skills (Sarkar, 2010) <sup>[2]</sup>. It has been argued that the most lawful procedure of evaluation is the usage of well-engrained norms, as a center for assessments. "Norms are the values considered to be the representative of a specified population. A test that has accompanying norms is definitely preferred to one that is usually based on age, weight, grade, height or various

combination of these characteristics" (Johnson and Nelson, 1988) <sup>[3]</sup>.

So far, in India, the selection of players is done in a very subjective manner i.e. on the basis of some competence showed in playing skills during the play spell. Moreover, very few physical education or coaches take into account the physical fitness level of the players. Consequently, the performance displayed by them in one situation may not always be reliable and consistent generally in other situation (Sarkar, 2010) <sup>[2]</sup>. It has been a well confirmed fact that physical fitness is directly linked with enhanced performance outcomes in sports (Singh *et al.*, 2017) <sup>[4]</sup>. Normative data pertaining to specific physical fitness parameters of football players is scarce. This highlights the greater need of establishing norms for selection of football players in order to make the selection criteria more objective and meritocratic. This study is an attempt to develop the norms for some selected physical fitness parameters with special consideration to the fitness of Goalkeepers of Football.

### 2. Methods and procedures

#### 2.1 Selection of subjects and variables

A total of forty (N=40), male college level Football Goalkeepers between the age group of 18-25 years were recruited from the various colleges of the Guru Nanak Dev University, Amritsar, Punjab, India. The purposive sampling technique was used to achieve the desired sample. Physical fitness variables and their respective tests are given in table-1:

**Table 1:** Physical Fitness parameters and their respective tests

Variable	Test	Measuring unit
Muscular strength	Handgrip strength test	Kilograms
Muscular Power	Vertical jump test	Centimeters
Muscular Endurance	Pull-up test	Maximum performed
Running Speed	20 meter dash	Seconds
Running Agility	Illinois agility test	Seconds
Jumping Ability	Standing long jump	Meters
Throwing Ability	Overhead medicine ball throw test	Meters
Flexibility	Sit and reach test	Inches
Balance	Stork balance test	Seconds

**2.2 Statistical Technique**

Descriptive data was expressed as mean and standard deviation. Percentile Scale was used as a statistical tool in order to determine the norms of different variables. Further, the scores were classified into five grades i.e. very good, good, average, poor and very poor.

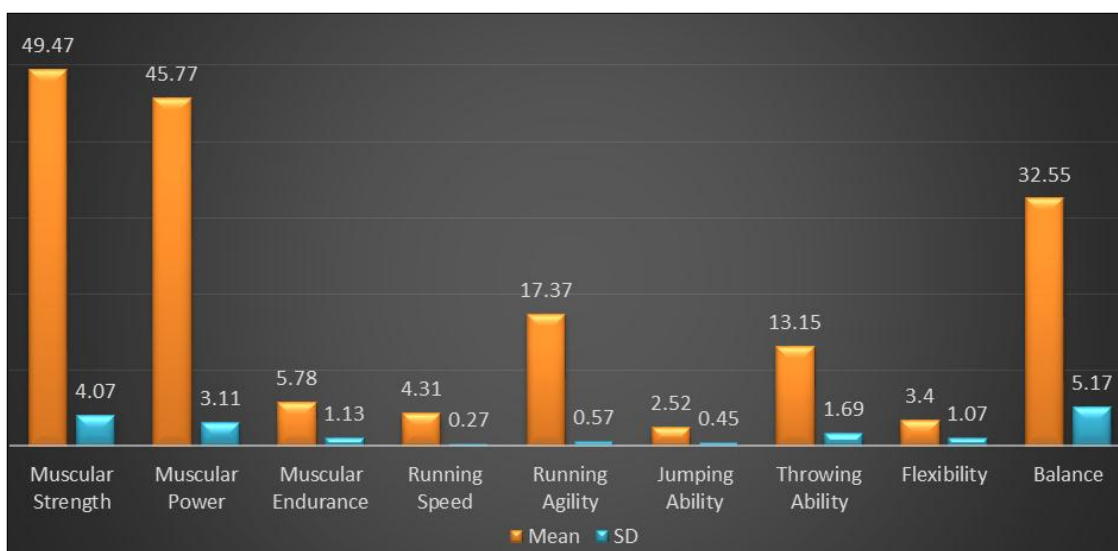
**3. Results**

**Table-2** shows that for Muscular Strength, the mean value was 49.47 and standard deviation was 4.07. For Muscular Power, the mean value was 45.77 and standard deviation was

3.11. For Muscular Endurance, the mean value was 5.78 and standard deviation was 1.13. For Running Speed, the mean score was 4.31 and standard deviation score was 0.27. For Running Agility, the mean score was 17.37 and standard deviation was 0.57. For Jumping Ability, the mean score was 2.52 and standard deviation was 0.45. For Throwing Ability, the mean score was 13.15 and standard deviation score was 1.69. For Flexibility, the mean score was 3.4 and standard deviation was 1.07. For Balance, the mean score was 32.55 and standard deviation was 5.17.

**Table 2:** Descriptive statistics of Physical Fitness Parameters

Test Items	Mean	Standard Deviation	Minimum	Maximum
Muscular Strength	49.47	4.07	55	42
Muscular Power	45.77	3.11	50	41
Muscular Endurance	5.78	1.13	7	4
Running Speed	4.31	0.27	4.7	3.71
Running Agility	17.37	0.57	18.3	16.23
Jumping Ability	2.52	0.45	3.36	1.74
Throwing Ability	13.15	1.69	15	10
Flexibility	3.4	1.07	5	2
Balance	32.55	5.17	40	24



**Fig 1:** Graphical portrayal of mean and standard deviation of physical fitness parameters

Table-3 depicts the percentile scores of each physical fitness parameter of football goalkeepers. It is evident from the table-1 the score for muscular strength at 10<sup>th</sup> percentile was 42.20 and 90<sup>th</sup> was 54.90. For Muscular power, score at 10<sup>th</sup>

percentile was 41.10 and 90<sup>th</sup> was 50.00. For muscular endurance, score at 10<sup>th</sup> percentile was 4 and 90<sup>th</sup> was 7. For running speed, score at 10<sup>th</sup> percentile was 4.69 and 90<sup>th</sup> was 3.93. For running agility, score at 10<sup>th</sup> percentile was 18.04

and 90<sup>th</sup> was 16.49. For jumping ability, score at 10<sup>th</sup> percentile was 1.89 and 90<sup>th</sup> was 3.27. For jumping ability, score at 10<sup>th</sup> percentile was 10.10 and 90<sup>th</sup> was 15.00. For

flexibility, score at 10<sup>th</sup> percentile was 2.00 and 90<sup>th</sup> was 5.00. For Balance, score at 10<sup>th</sup> percentile was 25.00 and 90<sup>th</sup> was 39.00.

**Table 3:** Percentile scores on each Physical fitness parameter

Variable		Muscular Strength	Muscular power	Muscular Endurance	Running speed	Running agility	Jumping ability	Throwing ability	Flexibility	Balance
Median		50.50	46.00	6.00	4.36	17.57	2.45	13.00	3.0000	32.50
Percentiles	10 <sup>th</sup>	43.10	41.10	4	4.69	18.04	1.89	10.10	2.00	25.00
	20 <sup>th</sup>	45.00	42.20	4	4.6	17.83	2.11	11.00	2.00	27.00
	30 <sup>th</sup>	47.00	43.00	5	4.54	17.79	2.21	13.00	3.00	29.00
	40 <sup>th</sup>	48.00	45.00	6	4.44	17.64	2.40	13.00	3.00	31.00
	50 <sup>th</sup>	50.50	46.00	6	4.36	17.57	2.44	13.00	3.00	32.50
	60 <sup>th</sup>	52.00	47.60	6	4.26	17.38	2.63	14.00	4.00	35.00
	70 <sup>th</sup>	52.00	48.00	7	4.15	17.02	2.72	14.70	4.00	36.70
	80 <sup>th</sup>	53.80	49.00	7	4.03	16.82	2.91	15.00	4.80	38.80
90 <sup>th</sup>	54.90	50.00	7	3.93	16.49	3.27	15.00	5.00	39.00	

**4. Discussion**

The study was aimed to develop the norms for selected physical fitness variables of Football goalkeepers. Sarkar (2010) [2], in his doctoral research highlighted the need of establishment of physical fitness norms for Football players playing at various positions. On this account this study was aimed to construct the norms for selected physical fitness parameters of Football goalkeepers. The results of this study exhibits minor variations with the norms for the similar physical fitness parameters of Kabaddi players (Sharma *et al.*, 2014). This could be due to the varied nature of these two games. Few other studies have worked on the development of norms for physical fitness parameters as the there is a greater need to work on this thematic area in different physical education and sports settings (Singh *et al.*, 2014; Sharma, 2017; Singh and Singh, 2013) [1, 4, 6].

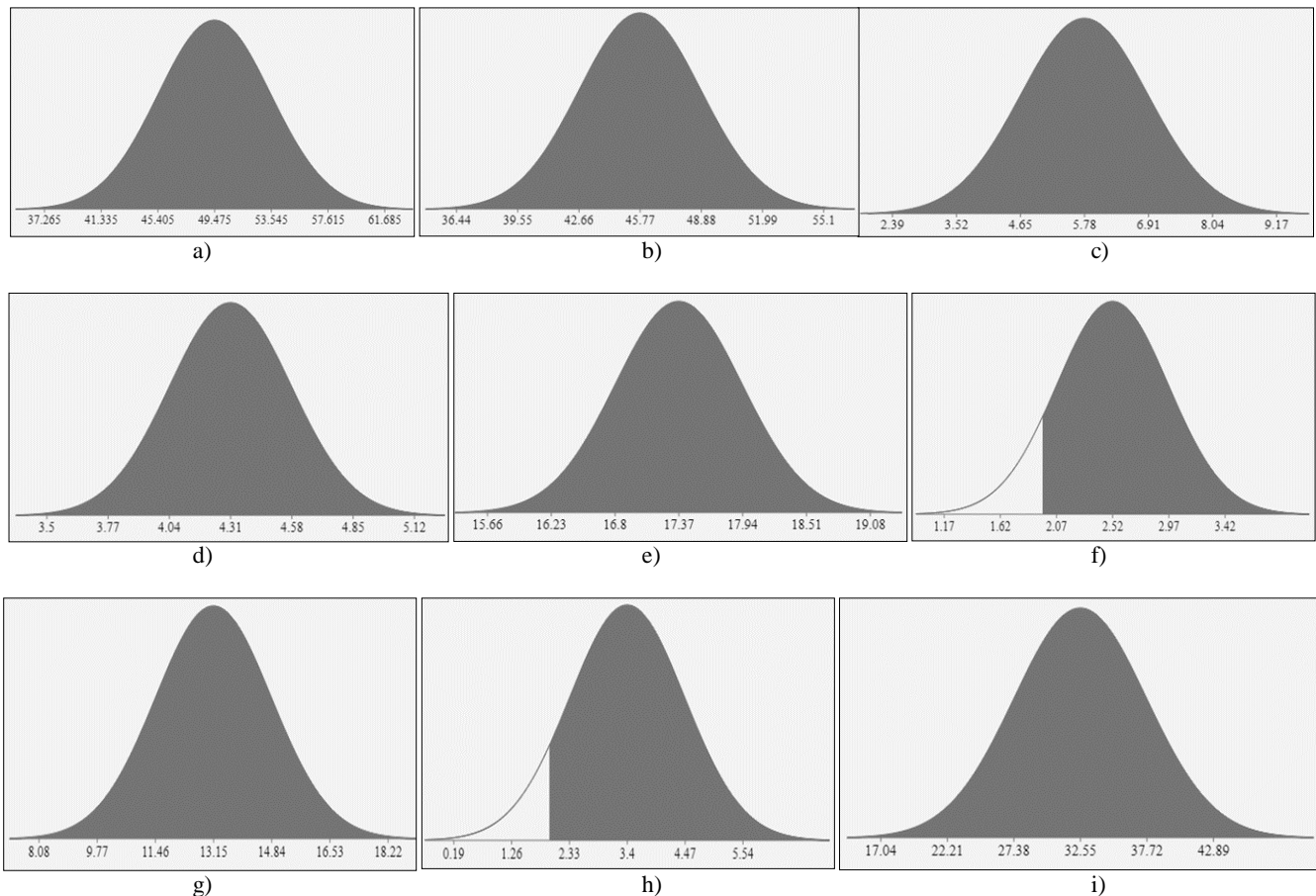
**Distribution of grades under normal distribution of scores**

For Muscular Strength, the scores below 41.335 are considered “very poor”, from about 41.335-45.404 is considered “poor”, 45.405-53.545 fall in “average”, 53.546-57.615 lie in “good” and the scores above 57.615 are considered “very good”. For Muscular Power, the scores below <39.55 are considered “very poor”, from about 39.55-42.65 fall in “poor”, 42.66-48.88 lie in “average”, 48.89-51.99 indicate “good” and the scores above 51.99 are considered

“very good”. For Muscular Endurance, the scores below 3.52 are considered very poor, 3.52-4.64 indicate “poor”, 4.65-6.91 designate “average”, 6.92-8.04 are considered “good” and the scores above 8.04 are considered “very good”. For Running Speed, the scores above 4.85 are considered “very poor”, 4.85-4.59 designate “poor”, 4.58-4.04 is considered “average”, 4.03-3.77 is considered “good” and the scores below 3.77 are considered “very good”. For Running Agility, the scores above 18.51 are considered “very poor”, 18.51-17.93 is considered “poor”, 17.94-16.8 lie in “average”, 16.79-16.23 indicate “good” and the scores below 16.23 indicate “very good”. For Jumping Ability, the scores below 1.62 indicate “very poor”, 1.62-2.06 indicate “poor”, 2.07-2.97 fall in “average”, 2.98-3.42 fall in “good” and the scores above 3.42 indicate “very good”. For Throwing Ability, the scores below 9.77 are considered “very poor”, 9.77-11.45 lie in “poor”, 11.46-14.84 fall in “average”, 14.84-16.53 is considered “good” and the scores above 16.53 are considered “very good”. For Flexibility, the scores below 1.26 are considered very poor, from about 1.26-2.32 indicate “poor”, 2.33-4.47 is considered “average”, 4.48-5.54 indicate “good” and the scores above 5.54 are considered “very good”. For Balance, the scores below 22.21 are considered “very poor”, 22.21-27.37 indicate “poor”, 27.38-37.72 designate “average”, 37.73-42.89 designate “good” and the scores above 42.89 are considered “very good”.

**Table 4:** Normative values of each Physical fitness parameter for Male Football Goalkeepers

Test Items	Very Poor	Poor	Average	Good	Very Good
Muscular Strength (Kg)	< 41.335	41.335-45.404	45.405-53.545	53.546-57.615	>57.615
Muscular Power (cms)	<39.55	39.55-42.65	42.66-48.88	48.89-51.99	>51.99
Muscular Endurance (max.)	<3.52	3.52-4.64	4.65-6.91	6.92-8.04	>8.04
Running Speed (secs.)	>4.85	4.85-4.59	4.58- 4.04	4.03-3.77	< 3.77
Running Agility (secs.)	>18.51	18.51-17.93	17.94-16.8	16.79-16.23	<16.23
Jumping Ability (cms.)	<1.62	1.62-2.06	2.07-2.97	2.98-3.42	>3.42
Throwing Ability (meters)	< 9.77	9.77-11.45	11.46-14.84	14.85-16.53	>16.53
Flexibility (Inches)	< 1.26	1.26-2.32	2.33-4.47	4.48-5.54	> 5.54
Balance (secs.)	< 22.21	22.21-27.37	27.38-37.72	37.73-42.89	>42.89



**Fig 2:** Values under Normal distribution of selected Physical Fitness parameters (i.e., a. Muscular Strength, b. Muscular Power, c. Muscular Endurance, d. Running Speed, e. Running Agility, f. Jumping Ability, g. Throwing Ability, h. Flexibility & i. Balance)

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